

## Complete Summary

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### GUIDELINE TITLE

Best practice guideline for the subcutaneous administration of insulin in adults with type 2 diabetes.

### BIBLIOGRAPHIC SOURCE(S)

Registered Nurses Association of Ontario (RNAO). Best practice guideline for the subcutaneous administration of insulin in adults with type 2 diabetes. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2004 Jun. 91 p. [121 references]

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

SCOPE  
 METHODOLOGY - including Rating Scheme and Cost Analysis  
 RECOMMENDATIONS  
 EVIDENCE SUPPORTING THE RECOMMENDATIONS  
 BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS  
 QUALIFYING STATEMENTS  
 IMPLEMENTATION OF THE GUIDELINE  
 INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT  
 CATEGORIES  
 IDENTIFYING INFORMATION AND AVAILABILITY  
 DISCLAIMER

## SCOPE

### DISEASE/CONDITION(S)

Type 2 diabetes

### GUIDELINE CATEGORY

Counseling  
 Evaluation  
 Management

### CLINICAL SPECIALTY

Nursing

## INTENDED USERS

Advanced Practice Nurses  
Nurses

## GUIDELINE OBJECTIVE(S)

- To present nursing best practice guidelines for the subcutaneous administration of insulin in adults with type 2 diabetes
- To assist nurses who do not specialize in diabetes education and care to administer insulin safely and to teach basic self-management skills to clients who require insulin therapy

## TARGET POPULATION

Individuals 18 years and older with type 2 diabetes requiring subcutaneous insulin therapy

## INTERVENTIONS AND PRACTICES CONSIDERED

Evaluation

Assessment of patient psychosocial factors

Management/Treatment/Counseling

1. Provide appropriate teaching for patients and their caregivers to include:
  - Insulin preparation and administration
  - Self-testing technique, meter maintenance and accuracy verification
  - Prevention, recognition, and treatment of hypoglycemia
  - Management adjustments during periods of illness
2. Evaluate understanding of previous teaching and reeducate or reinforce as needed
3. Nursing education recommendations and strategies directed at the competencies required for practice
4. Organization and policy recommendations and strategies directed at practice settings and the environment in order to facilitate nurses' practice.

## MAJOR OUTCOMES CONSIDERED

- Morbidity
- Glycemic control
- Safety of subcutaneous administration of insulin

## METHODOLOGY

## METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)  
Searches of Electronic Databases  
Searches of Unpublished Data

## DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

A database search for existing guidelines was conducted by a university health sciences library. An initial search of the MEDLINE, Embase, and CINAHL databases for guidelines and articles published from January 1, 1995, to December 2002, was conducted using the following search terms: "type 2 diabetes", "diabetes self-care education", "insulin initiation", "self-care", "self management", "systematic reviews", "practice guideline(s)", "clinical practice guideline(s)", "standards", "consensus statement(s)", "consensus", "evidence-based guidelines" and "best practice guidelines".

One individual searched an established list of Web sites for content related to the topic area. This list of sites, reviewed and updated in October 2002, was compiled based on existing knowledge of evidence-based practice Web sites, known guideline developers, and recommendations from the literature. Presence or absence of guidelines was noted for each site searched as well as date searched. The Web sites at times did not house a guideline but directed to another Web site or source for guideline retrieval. Guidelines were either downloaded if full versions were available or were ordered by phone/e-mail.

A Web site search for existing diabetes guidelines was conducted via the search engine "Google", using the search terms identified above. One individual conducted this search, noting the search term results, the Web sites reviewed, date and a summary of the findings. The search results were further critiqued by a second individual who identified guidelines and literature not previously retrieved.

Additionally, panel members were already in possession of a few of the identified guidelines. In some instances, a guideline was identified by panel members and not found through the previous search strategies. These were guidelines that were developed by local groups or specific professional associations.

The final step in determining whether the clinical practice guideline would be critically appraised was to have two individuals screen the guidelines based on the following criteria. These criteria were determined by panel consensus:

- Guideline was in English, international in scope.
- Guideline dated no earlier than 1998.
- Guideline was strictly about the topic area.
- Guideline was evidence-based (e.g. contained references, description of evidence, sources of evidence).
- Guideline was available and accessible for retrieval.

Four guidelines were deemed suitable for critical review using the Appraisal of Guidelines for Research and Evaluation instrument.

## NUMBER OF SOURCE DOCUMENTS

Following the appraisal process, the guideline development panel identified four guidelines to develop the recommendations cited in the guideline.

## METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

## RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

### Level of Evidence

I a - Evidence obtained from meta-analysis or systematic review of randomized controlled trials

I b - Evidence obtained from at least one randomized controlled trial

II a - Evidence obtained from at least one well-designed controlled study without randomization

II b - Evidence obtained from at least one other type of well-designed quasi-experimental study, without randomization

III - Evidence obtained from well-designed nonexperimental descriptive studies, such as comparative studies, correlation studies, and case studies

IV - Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities

## METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses  
Systematic Review

## DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

## METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

## DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

In January of 2003, a panel of nurses with expertise in practice and education related to diabetes, from institutional and community settings, was established by the Registered Nurses Association of Ontario (RNAO). At the onset, the panel discussed and came to consensus on the scope of the best practice guideline.

The panel members divided into subgroups to undergo specific activities using the short-listed guidelines, other literature, and additional resources for the purpose of drafting recommendations for nursing interventions. This process yielded a draft set of recommendations. The panel members as a whole reviewed the recommendations, discussed gaps and available evidence, and came to consensus on a draft guideline.

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

## COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

## METHOD OF GUIDELINE VALIDATION

External Peer Review  
Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The development process yielded an initial set of recommendations. The panel members as a whole reviewed the recommendations, discussed gaps and available evidence, and came to a consensus on a draft guideline.

This draft was submitted to a set of external stakeholders for review and feedback. Stakeholders represented various health care disciplines, as well as professional associations. External stakeholders were provided with specific questions for comment, as well as the opportunity to give overall feedback and general impressions. The results were compiled and reviewed by the development panel. Discussion and consensus resulted in revisions to the draft document prior to publication and evaluation.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

The levels of evidence supporting the recommendations (Ia, Ib, IIa, IIb, III, IV) are defined at the end of the "Major Recommendations" field

	Recommendation	Level of Evidence
Practice Recommendations	1. Nurses should assess psychosocial factors that may affect the individual's ability to successfully initiate insulin therapy.	III

	Recommendation	Level of Evidence
	Assessment strategies that include the use of open-ended questions to assess barriers, stressors, self-efficacy, and beliefs about insulin initiation should be used.	
	2. Education for administering insulin should be tailored in collaboration with the individual to address current knowledge, abilities, and needs.	Ia
	3. Nurses should provide and/or reinforce appropriate teaching regarding insulin preparation and administration. Topics to include are: <ul style="list-style-type: none"> <li>• Insulin: type, action, stability, storage, and compatibility</li> <li>• Preparation and administration of insulin</li> <li>• Sharps disposal</li> <li>• Follow-up for medical and self-care support</li> </ul>	IV
	4. Nurses should encourage blood glucose self-monitoring as an integral part of daily diabetes management for individuals taking insulin. The recommended frequency of testing will vary according to diabetes treatment and the individual's need and ability.	III
	5. Individuals who self-monitor blood glucose should receive initial instruction and periodic reeducation regarding self-testing technique, meter maintenance, and verification of accuracy of self-testing results.	III
	6. Nurses should ensure clients taking insulin receive appropriate basic nutrition information.	IV
	7. Clients treated with insulin and their caregivers should be taught how to prevent, recognize, and treat hypoglycemia.	IV
	8. Nurses must be aware of the effects of acute illness, surgery, and diagnostic procedures on blood glucose levels.	IV

	Recommendation	Level of Evidence
	9. Nurses should provide basic education on blood glucose monitoring, dietary, and medication adjustments for periods of illness. This information should be given initially and reviewed periodically with the client.	IV
Education Recommendation	10. Nursing curriculum should include education about the care and management of diabetes.	IV
Organization & Policy Recommendations	11. Health care organizations should facilitate ongoing diabetes education of nursing staff about diabetes care and management.	IV
	12. Organizations must ensure that individuals receiving insulin have ready access to an appropriate form of glucose at all times.	IV
	13. Organizations should develop and communicate appropriate policies and procedures to reduce the potential for medication errors related to insulin therapy.	IV
	14. Organizations should have a process for documentation to support nursing practice related to insulin therapy.	IV
	<p>15. Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational, and administrative support. Organizations may wish to develop a plan for implementation that includes:</p> <ul style="list-style-type: none"> <li>• An assessment of organizational readiness and barriers to education</li> <li>• Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process</li> <li>• Dedication of a qualified individual to provide the support needed for the education and implementation process</li> <li>• Ongoing opportunities for discussion and education to reinforce the importance of best practices</li> </ul>	IV

	Recommendation	Level of Evidence
	<ul style="list-style-type: none"> <li>• Opportunities for reflection on personal and organizational experience in implementing guidelines</li> </ul> <p>In this regard, the Registered Nurses Association of Ontario (RNAO) (through a panel of nurses, researchers, and administrators) has developed the Toolkit: Implementation of Clinical Practice Guidelines, based on available evidence, theoretical perspectives and consensus. The RNAO strongly recommends the use of this Toolkit for guiding the implementation of the best practice guideline on Best Practice Guideline for the Subcutaneous Administration of Insulin in Adults with Type 2 Diabetes.</p>	

#### Definitions:

#### Level of Evidence

I a - Evidence obtained from meta-analysis or systematic review of randomized controlled trials

I b - Evidence obtained from at least one randomized controlled trial

II a - Evidence obtained from at least one well-designed controlled study without randomization

II b - Evidence obtained from at least one other type of well-designed quasi-experimental study, without randomization

III - Evidence obtained from well-designed nonexperimental descriptive studies, such as comparative studies, correlation studies, and case studies

IV - Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities

#### CLINICAL ALGORITHM(S)

None provided

### EVIDENCE SUPPORTING THE RECOMMENDATIONS

#### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS



The type of evidence is provided for each recommendation (see "Major recommendations").

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

- This guideline will assist nurses who are not specialists in diabetes care to safely initiate and administer insulin, a "high-alert" medication.
- This guideline will provide answers to the question: What are the essential client self-care components to be addressed by nurses when caring for an adult with type 2 diabetes who requires subcutaneous insulin.
- Patients who receive support in achieving optimal glycemic control significantly reduce the risk of microvascular damage; the major cause of blindness and kidney disease and non-traumatic amputations.

### POTENTIAL HARMS

Not stated

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- The document needs to be reviewed and applied, based on the specific needs of the organization or practice setting/environment, as well as the needs and wishes of the client. Guidelines should not be applied in a "cookbook" fashion but used as a tool to assist in decision making for individualized client care, as well as ensuring that appropriate structures and supports are in place to provide the best possible care.
- These best practice guidelines are related only to nursing practice and not intended to take into account fiscal efficiencies. These guidelines are not binding for nurses and their use should be flexible to accommodate client/family wishes and local circumstances. They neither constitute a liability nor discharge from liability. While every effort has been made to ensure the accuracy of the contents at the time of publication, neither the authors nor the Registered Nurses Association of Ontario (RNAO) give any guarantee as to the accuracy of the information contained in them nor accept any liability, with respect to loss, damage, injury or expense arising from any such errors or omission in the contents of this work. Any reference throughout the document to specific pharmaceutical products as examples does not imply endorsement of any of these products.
- It is acknowledged that the individual competencies of nurses varies between nurses and across categories of nursing professionals (registered practical nurses [RPNs] and registered nurses [RNs]) and are based on knowledge, skills, attitudes, and judgement enhanced over time by experience and education. It is expected that individual nurses will perform only those aspects of care for which they have obtained appropriate education and experience. Both RNs and RPNs should seek consultation in instances where the client's care needs surpass the individual nurse's ability to act independently.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

Best practice guidelines can only be successfully implemented if there are adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. Registered Nurses Association of Ontario (RNAO), through a panel of nurses, researchers, and administrators has developed the Toolkit: Implementation of Clinical Practice Guidelines based on available evidence, theoretical perspectives, and consensus. The Toolkit is recommended for guiding the implementation of any clinical practice guideline in a health care organization.

The Toolkit provides step-by-step directions to individuals and groups involved in planning, coordinating, and facilitating guideline implementation. Specifically, the Toolkit addresses the following key steps:

1. Identifying a well-developed, evidence-based clinical practice guideline
2. Identification, assessment, and engagement of stakeholders
3. Assessment of environmental readiness for guideline implementation
4. Identifying and planning evidence-based implementation strategies
5. Planning and implementing evaluation
6. Identifying and securing required resources for implementation

Implementing practice guidelines that result in successful practice changes and positive clinical impact is a complex undertaking. The Toolkit is one key resource for managing this process.

### Evaluation and Monitoring

Organizations implementing the recommendations in this nursing best practice guideline are advised to consider how the implementation and its impact will be monitored and evaluated. A table found in the original guideline document, based on the framework outlined in the RNAO Toolkit: Implementation of clinical practice guidelines (2002b), illustrates some suggested indicators for monitoring and evaluation.

### IMPLEMENTATION TOOLS

#### Tool Kits

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

#### Living with Illness

## IOM DOMAIN

Effectiveness  
Patient-centeredness  
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Registered Nurses Association of Ontario (RNAO). Best practice guideline for the subcutaneous administration of insulin in adults with type 2 diabetes. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2004 Jun. 91 p. [121 references]

### ADAPTATION

The panel, following the appraisal process, identified the following guidelines, and related updates, to adapt and modify recommendations:

- American Diabetes Association (2003). American Diabetes Association: Clinical practice recommendations 2003. *Diabetes Care*, 26, (Suppl), S1-S156.
- \*Meltzer, S., Leiter, L., Daneman, D., Gerstein, H. C., Lau, D., Ludwig, S. et al. (1998). 1998 clinical practice guidelines for the management of diabetes in Canada. *Canadian Medical Association Journal*. [On-line]. Available: [www.cmaj.ca/cgi/data/159/8/DC1/1](http://www.cmaj.ca/cgi/data/159/8/DC1/1)
- Wolever, T., Barbeau, M. C., Charron, S., Harrigan, K., Leung, S., Madrick, B. et al. (1998). Guidelines for the nutritional management of diabetes mellitus in the new millennium: A position statement by the Canadian Diabetes Association. *Canadian Journal of Diabetes Care*, 23(3), 56-69.
- Yale, J. F., Begg, I., Gerstein, H., Houlden, R., Jones, H., Maheux, P. et al. (2002). 2001 Canadian Diabetes Association clinical practice guidelines for the prevention and management of hypoglycemia in diabetes. *Canadian Journal of Diabetes*, 26, 22-35. [On-line]. Available: [www.diabetes.ca/Files/CDAHypoglycemiaGuidelines.pdf](http://www.diabetes.ca/Files/CDAHypoglycemiaGuidelines.pdf)

\* The 1998 Clinical Practice Guidelines for the Management of Diabetes in Canada were updated in 2003. Information obtained from the 1998 guidelines was updated to reflect the new information from the 2003 Clinical Practice Guidelines for the Management of Diabetes in Canada.

### DATE RELEASED

2004 Jun

### GUIDELINE DEVELOPER(S)

Registered Nurses Association of Ontario - Professional Association

### SOURCE(S) OF FUNDING

Funding was provided by the Ontario Ministry of Health and Long Term Care.

#### GUIDELINE COMMITTEE

Not stated

#### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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#### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Declarations of interest and confidentiality were made by all members of the guideline development panel. Further details are available from the Registered Nurses Association of Ontario (RNAO).

#### GUIDELINE STATUS

This is the current release of the guideline.

#### GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Registered Nurses Association of Ontario \(RNAO\) Web site](#).

Print copies: Available from the Registered Nurses Association of Ontario (RNAO), Nursing Best Practice Guidelines Project, 158 Pearl Street, Toronto, Ontario M5H 1L3.

#### AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Summary of recommendations. Best practice guideline for the subcutaneous administration of insulin in adults with Type 2 diabetes. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2004 Jun. 2 p.

Electronic copies: Available in Portable Document Format (PDF) from the [Registered Nurses Association of Ontario \(RNAO\) Web site](#).

- Toolkit: implementation of clinical practice guidelines. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2002 Mar. 88 p.

Electronic copies: Available in Portable Document Format (PDF) from the [Registered Nurses Association of Ontario \(RNAO\) Web site](#).

Print copies: Available from the Registered Nurses Association of Ontario (RNAO), Nursing Best Practice Guidelines Project, 158 Pearl Street, Toronto, Ontario M5H 1L3.

## PATIENT RESOURCES

None available

## NGC STATUS

This NGC summary was completed by ECRI on November 3, 2004. The information was verified by the guideline developer on November 23, 2004.

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Registered Nurses Association of Ontario (2004). Best practice guideline for the subcutaneous administration of insulin in adults with type 2 diabetes. Toronto, Canada: Registered Nurses Association of Ontario.

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